

CLAIMS

Therefore, having thus described the invention, at least the following is claimed:

- 1 1. A method for manipulating a graphical display, the method comprising the
2 steps of:
3 providing a graphical user interface comprising a first portion for providing a
4 graphical display, the graphical display comprising a plurality of image objects;
5 receiving a user selection of a first image object in the first portion of the
6 graphical user interface;
7 displaying a target area containing the first image object selected;
8 receiving a user selection of a second image object in the first portion of the
9 graphical user interface; and
10 modifying the displayed target area such that the target area contains the first
11 and second image objects.
- 1 2. The method of claim 1, wherein the step of modifying the displayed target area
2 comprises centering the target area with respect to the first and second image objects
3 selected.

1 3. The method of claim 1, wherein the step of modifying the displayed target area
2 comprises displaying the target area such that the first and second image objects are
3 contained within the target area and a maximum number of the image objects not
4 selected are contained in the target area.

1 4. The method of claim 1, wherein the target area comprises a square.

1 5. The method of claim 1, wherein the step of receiving a user selection of a first
2 image object and the step of receiving a user selection of a second image object is via
3 a cursor manipulated by a mouse.

1 6. A method for manipulating a graphical display of a printed circuit board
2 model, the printed circuit board model adapted to be used in an automated x-ray
3 inspection system for detecting defects in a manufactured printed circuit board having
4 one or more components comprising one or more pins soldered to the printed circuit
5 board, the method comprising the steps of:

6 providing a graphical user interface comprising a first portion for providing a
7 graphical display of a printed circuit board model comprising a plurality of image
8 objects associated with a printed circuit board;

9 receiving a user selection of a first image object in the first portion of the
10 graphical user interface;

11 displaying a target area containing the first image object selected;

12 receiving a user selection of a second image object in the first portion of the
13 graphical user interface; and

14 modifying the displayed target area such that the target area contains the first
15 and second image objects.

1 7. The method of claim 6, wherein the step of modifying the displayed target area
2 comprises centering the target area with respect to the first and second image objects
3 selected.

1 8. The method of claim 6, wherein the step of modifying the displayed target area
2 comprises displaying the target area such that the first and second image objects are
3 contained within the target area and a maximum number of the image objects not
4 selected are contained in the target area.

1 9. The method of claim 6, wherein at least one of the plurality of image objects
2 comprises a family object that specifies a type of solder joint.

1 10. The method of claim 6, wherein at least one of the plurality of image objects
2 comprises a package object that specifies a type of component.

1 11. The method of claim 6, wherein at least one of the plurality of image objects
2 comprises a pin object that specifies a unique pin number for a specific component in
3 the printed circuit board.

1 12. The method of claim 6, wherein the target area comprises a square.

1 13. The method of claim 6, wherein the step of receiving a user selection of a first
2 image object and the step of receiving a user selection of a second image object is via
3 a cursor manipulated by a mouse.

1 14. A computer program embodied in a computer-readable medium for
2 manipulating a graphical display, the computer program comprising logic configured
3 to:
4 provide a graphical user interface comprising a first portion for providing a
5 graphical display, the graphical display comprising a plurality of image objects;
6 receive a user selection of a first image object in the first portion of the
7 graphical user interface;
8 display a target area containing the first image object selected;
9 receive a user selection of a second image object in the first portion of the
10 graphical user interface; and
11 modify the displayed target area such that the target area contains the first and
12 second image objects.

1 15. The computer program of claim 14, wherein the logic is further configured to
2 modify the displayed target area by centering the target area with respect to the first
3 and second image objects selected.

1 16. The computer program of claim 14, wherein the logic is further configured to
2 modify the displayed target area by displaying the target area such that the first and
3 second image objects are contained within the target area and a maximum number of
4 the image objects not selected are contained in the target area.

1 17. The computer program of claim 14, wherein the target area comprises a
2 square.

1 18. The computer program of claim 14, wherein the logic is further configured to
2 receive the user selection of a first image object and a second image object via a
3 cursor manipulated by a mouse.

1 19. A computer program embodied in a computer-readable medium for
2 manipulating a graphical display of a printed circuit board model, the printed circuit
3 board model adapted to be used in an automated x-ray inspection system for detecting
4 defects in a manufactured printed circuit board having one or more components
5 comprising one or more pins soldered to the printed circuit board, the computer
6 program comprising logic configured to:

7 provide a graphical user interface comprising a first portion for providing a
8 graphical display of a printed circuit board model comprising a plurality of image
9 objects associated with a printed circuit board;

10 receive a user selection of a first image object in the first portion of the
11 graphical user interface;

12 display a target area containing the first image object selected;

13 receive a user selection of a second image object in the first portion of the
14 graphical user interface; and

15 modify the displayed target area such that the target area contains the first and
16 second image objects.

1 20. The computer program of claim 19, wherein the logic is further configured to
2 modify the displayed target area by centering the target area with respect to the first
3 and second image objects selected.

1 21. The computer program of claim 19, wherein the logic is further configured to
2 modify the displayed target area by displaying the target area such that the first and
3 second image objects are contained within the target area and a maximum number of
4 the image objects not selected are contained in the target area.

1 22. The computer program of claim 19, wherein at least one of the plurality of
2 image objects corresponds to a solder joint.

1 23. The computer program of claim 19, wherein at least one of the plurality of
2 image objects corresponds to a component.

1 24. The computer program of claim 19, wherein at least one of the plurality of
2 image objects corresponds to a pin.

1 25. The computer program of claim 20, wherein the target area comprises a
2 square.

1 26. The computer program of claim 19, wherein the logic is further configured to
2 receive the user selection of a first image object a second image via a cursor
3 manipulated by a mouse.

1 27. A system for manipulating a graphical display of a printed circuit board model,
2 the printed circuit board model adapted to be used in an automated x-ray inspection
3 system for detecting defects in a manufactured printed circuit board having one or
4 more components comprising one or more pins soldered to the printed circuit board,
5 the system comprising:

6 a means for providing a graphical user interface comprising a first portion for
7 providing a graphical display of a printed circuit board model comprising a plurality
8 of image objects associated with a printed circuit board;

9 a means for receiving a user selection of one or more of the image objects in
10 the first portion of the graphical user interface; and

11 a means for displaying a target area such that the target area contains one or
12 more image objects selected and a maximum number of the image objects not selected
13 are contained in the target area.

1 28. A system for manipulating a graphical display of a printed circuit board model,
2 the printed circuit board model adapted to be used in an automated x-ray inspection
3 system for detecting defects in a manufactured printed circuit board having one or
4 more components comprising one or more pins soldered to the printed circuit board,
5 the system comprising:

6 logic configured to:

7 provide a graphical user interface comprising a first portion for

8 providing a graphical display of a printed circuit board model comprising a

9 plurality of image objects associated with a printed circuit board;

10 receive a user selection of a first image object in the first portion of the
11 graphical user interface;

12 display a target area containing the first image object selected;

13 receive a user selection of a second image object in the first portion of
14 the graphical user interface; and

15 modify the displayed target area such that the target area contains the
16 first and second image objects;

17 a processing device configured to implement the logic; and

18 a display device configured to support the graphical user interface

1 29. The system of claim 28, wherein the logic is further configured to modify the
2 displayed target area by centering the target area with respect to the first and second
3 image objects selected.

1 30. The system of claim 28, wherein the logic is further configured to modify the
2 displayed target area by displaying the target area such that the first and second image
3 objects are contained within the target area and a maximum number of the image
4 objects not selected are contained in the target area.

1 31. The system of claim 28, wherein at least one of the plurality of image objects
2 corresponds to a solder joint.

1 32. The system of claim 28, wherein at least one of the plurality of image objects
2 corresponds to a component.

1 33. The system of claim 28, wherein at least one of the plurality of image objects
2 corresponds to a pin.

1 34. The system of claim 29, wherein the target area comprises a square.

1 35. The system of claim 28, wherein the logic is further configured to receive the
2 user selection of a first image object a second image via a cursor manipulated by a
3 mouse.